

WHAT IS CLAIMED IS:

1. A piezoelectric/electrostrictive device made of
piezoelectric/electrostrictive film which comprises: a
5 substrate section; and an operation section disposed on the
substrate section and constituted of a piezoelectric/
electrostrictive film and an electrode film; said device
being capable of operating by displacement of the operation
section,

10 wherein the operation section comprises the
piezoelectric/electrostrictive films and electrode films
alternately laminated so that uppermost and lowermost layers
form the electrode films,

15 wherein the operation and substrate sections are
integrated by firing, and

wherein the substrate section is constituted of a
ceramics containing a titanium element.

2. The piezoelectric/electrostrictive device made
20 of piezoelectric/electrostrictive film according to claim 1,
wherein for the substrate section, a content of the titanium
element of a projected section projected by the electrode
film of the lowermost layer of the operation section is
different from that of the titanium element of a non-
25 projected section.

3. The piezoelectric/electrostrictive device made

of piezoelectric/electrostrictive film according to claim 2, wherein the content of the titanium element of the projected section is larger than that of the titanium element of the non-projected section.

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4. The piezoelectric/electrostrictive device made of piezoelectric/electrostrictive film according to claim 1, wherein the substrate section contains 0.3 to 4% by mass of the titanium element in an equivalent amount of titanium
10 oxide in the projected section projected by the electrode film of the lowermost layer of the operation section.

5. The piezoelectric/electrostrictive device made of piezoelectric/electrostrictive film according to claim 1,
15 wherein the ceramics constituting the substrate section is zirconium oxide.

6. The piezoelectric/electrostrictive device made of piezoelectric/electrostrictive film according to claim 1,
20 wherein the substrate section has a thickness of 2 to 10 μm .

7. The piezoelectric/electrostrictive device made of piezoelectric/electrostrictive film according to claim 1, wherein the electrode film is constituted of a material
25 containing platinum which is a major component.

8. The piezoelectric/electrostrictive device made

of piezoelectric/electrostrictive film according to claim 1, wherein the electrode film is dense in at least the lowermost layer which contacts the substrate section.

5 9. The piezoelectric/electrostrictive device made of piezoelectric/electrostrictive film according to claim 1, wherein the operation section includes two to four layers of the piezoelectric/electrostrictive films.

10 10. A manufacturing method of a piezoelectric/
electrostrictive device made of piezoelectric/
electrostrictive film which comprises: a substrate section;
and an operation section disposed on the substrate section
and constituted of a piezoelectric/electrostrictive film and
15 an electrode film; said device being capable of operating by
displacement of the operation section, wherein the operation
section comprises the piezoelectric/electrostrictive films
and electrode films alternately laminated so that uppermost
and lowermost layers form the electrode films, wherein the
20 operation and substrate sections are integrated by firing,
and wherein the substrate section is constituted of a
ceramics containing a titanium element, the manufacturing
method comprising the step of:

 using a conductor material containing 0.3 to 8% by
25 mass of titanium oxide as a material of the electrode film of
the lowermost layer which contacts the substrate section to
carry out a heat treatment so that the substrate section

contains the titanium element.

11. The manufacturing method of the piezoelectric/
electrostrictive device made of piezoelectric/
5 electrostrictive film according to claim 10, wherein an
average particle size of titanium oxide contained in the
material of the electrode film is 0.05 to 0.4 μm .

12. A manufacturing method of a
10 piezoelectric/electrostrictive device made of
piezoelectric/electrostrictive film which comprises: a
substrate section; and an operation section disposed on the
substrate section and constituted of a piezoelectric/
electrostrictive film and an electrode film; said device
15 being capable of operating by displacement of the operation
section, wherein the operation section comprises the
piezoelectric/electrostrictive films and electrode films
alternately laminated so that uppermost and lowermost layers
form the electrode films, wherein the operation and substrate
20 sections are integrated by firing, and wherein the substrate
section is constituted of a ceramics containing a titanium
element,

wherein the substrate section is constituted of a
material containing titanium oxide having been prepared
25 beforehand.